

# **BEYER WEAVER & THOMAS, LLP**

INTELLECTUAL PROPERTY LAW

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## **FACSIMILE COVER SHEET**

March 24, 2005

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**Our Ref. No.: 03-1119/LSIIP235**

**Re: AMENDMENT A  
U.S. Patent Application No. 10/721,971  
Filed: November 24, 2003  
Title: "Method for Creating Barrier Layers for Copper Diffusion"**

**Pages Including Cover Sheet(s): 13**

### **MESSAGE:**

#### **CONFIDENTIALITY NOTE**

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seed layer over the implantation layer. Thus, implanting a trench and then forming a seed layer formed thereon is new and not suggested by the cited art. Accordingly, the cited art does not teach all of the claim limitations.

This point is similarly made in Claim 17 wherein the IC includes "a first calcium implant region comprising a concentration of Ca atoms incorporated into the sidewalls of the channel under the seed layer using ion implantation". This is also not taught by any of the cited art. Absent any such teaching, the cited art fails to anticipate the claimed invention.

The cited art fails to anticipate the claimed inventions for several reasons, including the fact that the cited art fails to teach implanting the trench sidewalls to form a barrier layer and subsequently forming a seed layer over that implantation created barrier layer. Nor does the cited art teach implanting the trench sidewalls with calcium. In the cited art, calcium is only implanted into an existing barrier layer. Here, in the claimed invention, the implanted materials (e.g., calcium) are directly implanted into the trench prior to the formation of the barrier layer. Therefore, the applicants submit that the amendments to the claims have overcome the pending grounds of rejection. Accordingly, the applicants request that the Examiner withdraw the pending ground of rejection and allow the rejected claims.

#### Rejections Under 35 U.S.C. § 103

Claims 3, 5, 6, 9-11, 14, and 15 have been rejected under 35 U. S. C. § 103(a) as being unpatentable over *Lopatin*, in view of, variously, *Hook et al.* (USPN 6,0983,794) and *Besser et al.* (USPN 6,703,308) and also in view of MPEP 2144.05 II.

The applicants respectfully point out, for at least the reasons set forth above, that none of the cited art teach or suggest the limitations of "forming a seed layer over implanted sidewalls in the trench" (e.g., Claim 1 and all claims depending therefrom) or "a first calcium implant region comprising a concentration of Ca atoms incorporated into the sidewalls of the channel under the seed layer using ion implantation" (e.g., Claim 17 and all claims depending therefrom). *Lopatin* does not teach these limitations, nor do any of the supplementary references do anything to correct this deficiency. Absent any such teaching or suggestion the cited art fails to teach all of the claimed limitations. Therefore, the cited art has failed to establish a prima facie case of obviousness as the rejected claims. Accordingly, it is respectfully requested that this grounds of rejection be withdrawn as to Claims 3, 5, 6, 9-11, 14, and 15 allowed to issue.

**Allowable Claims**

Claims 12, 13, and 19 were deemed allowable if amended to incorporate the base claim and the intervening limitations. Because the applicants believe that the amendments to the base claims are sufficient to obtain allowance of all pending claims 12, 13, and 19 have not yet been amended. However, the applicants are willing, should it become necessary at some future time, to amend these claims.

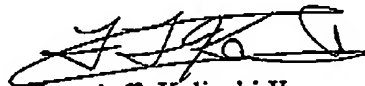
**Conclusion:**

In view of the foregoing amendments and remarks, it is respectfully submitted that the claimed invention as presently presented is patentable over the art of record and that this case is now in condition for allowance.

Should the Examiner, for any reason, wish to contact the undersigned, he is cordially invited to do so at his convenience. Moreover, if the Examiner has any continuing concerns regarding this case, he is invited to contact the undersigned at (650) 961-8300.

Respectfully submitted,

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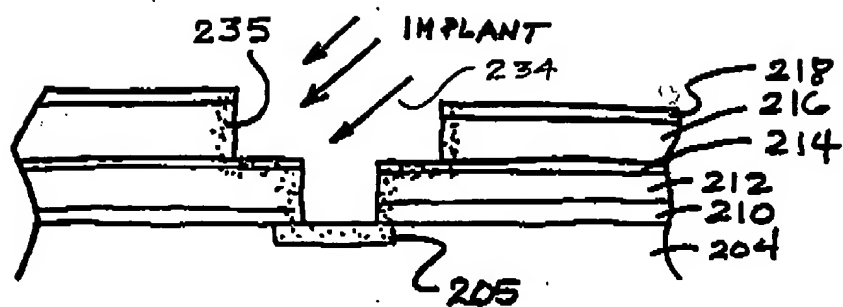


FIG. 2F'